1995 Toxics Release Inventory Public Data Release

OVERVIEW

In this Overview:

CHAPTER 1: INTRODUCTION

The Toxics Release Inventory (TRI) is a publicly available database that contains specific toxic chemical release and transfer information from manufacturing facilities. This document is part of a broad initiative by the Environmental Protection Agency (EPA) to provide the public with information on the release and transfer of these chemicals. While not all the information contained in the TRI will be found in this document, many significant pieces of TRI data are presented.

The 1995 Public Data Release is being conducted in two phases. This document represents the results of the first phase. The purpose of this phase is to summarize the basics of the 1995 data and discuss significant nationwide trends. The report includes such topics as information on releases, transfers, and on-site waste management practices by state, industry type (including federal facilities), and chemicals, pollution prevention information, and presents an initial comparison of the 1995 data against the two previous years (1993 and 1994) and 1988 (the first year data was analyzed). A more comprehensive report will be issued in the Fall of this year (1997). This second report will analyze the TRI data by industry sector and will provide some of the more detailed analysis found in past year's data release reports.

CHAPTER 2: TRI REPORTING

Chapter 2 presents a general overview of TRI reporting. More complete information can be found in Chapter 2 of this report.

Box 1. Who Must Report to TRI?

A facility must report to TRI if it:

- Conducts manufacturing operations within Standard Industrial Classification (SIC) codes 20 through 39;
- Has 10 or more full-time equivalent employees; and
- Manufactures or processes more than 25,000 pounds or otherwise uses more than 10,000 pounds of any listed chemical during the calendar year.

Box 2. What Must Be Reported?

Information reported by facilities includes:

- Amounts of each listed chemical released to the environment at the facility;
- Amounts of each chemical shipped from the facility to other locations for recycling, energy recovery, treatment, or disposal;
- Amounts of each chemical recycled, burned for energy recovery, or treated at the facility;
- Maximum amount of chemical present on-site at the facility during the year;
- Types of activities conducted at the facility involving the toxic chemical;
- Source reduction activities;
- Environmental permits held; and
- Name and telephone number of a contact person.

What are the Benefits and Limitations of the Data?

The TRI program has given the public unprecedented direct access to toxic chemical release and transfer data at the local, state, regional, and national level. Responsible use of this data can help:

- The public to identify potential environmental concerns, gain better understanding of potential risks, and work with industry and government in addressing concerns and risks.

- Federal, state, and local governments to compare chemical release and transfer data across facilities or geographic areas, evaluate existing environmental programs, establish regulatory priorities, and track pollution control and waste reduction progress.

- Industry to obtain an overview of the use and release of toxic chemicals, identify and reduce costs associated with toxic waste, identify promising areas of pollution prevention, establish reduction targets, and to measure and document progress toward reduction goals.

TRI data alone cannot provide a complete picture about risk potential. While the TRI data are a useful starting point, many other factors must be evaluated prior to making a determination of potential risk to public health or the environment. These factors should include the toxicity of the chemical, the extent of exposure, life cycle of chemicals used, the type of release, population densities, and the conditions of the environment. For example, small releases of highly toxic chemicals may present a greater risk than large releases of less toxic chemicals. Direct releases, such as air emissions, may pose a greater threat to human health and the environment than more contained releases, such as underground injection.

How Can I Obtain Additional TRI Information?

Information about accessing the TRI database is provided on the inside front cover of this book, as well as in Appendix B. The TRI User Support Service (202) 260-1531 can provide assistance in accessing and using the TRI data. To request copies of TRI and EPCRA documents or to obtain further information about the program, contact the toll-free Emergency Planning and Community Right-to-Know Information Hotline at 1-800-424-9346.

CHAPTER 3: TRI IN PERSPECTIVE

The TRI program is a dynamic one. Since its inception over 10 years ago, the program has seen many changes aimed at improving the public's access to information on chemical releases and transfers in their communities and making reporting easier for facilities. Table 1 presents brief summaries of EPA's TRI expansion activities, TRI program revisions, and development of international TRI programs.

Table 1. Current TRI Expansion Activities

Phase 1: Chemical Expansion

On November 30, 1994, EPA added 286 chemicals and chemical categories to the TRI. This expansion of the chemical list nearly doubled the number of chemicals on the TRI, bringing the total number of chemicals to 647.

EPA has streamlined the reporting requirement for facilities with small annual reportable amounts of listed toxic chemicals. Facilities which have annual reportable amounts of a listed toxic chemical that do not exceed 500 pounds can apply a higher activity threshold in determining their reporting obligations. These facilities do not have to complete a Form R, but can file a shorter certification statement form (Form A).

Phase 2: Facility Expansion

In the spring of 1997, EPA is proposing to add a number of non-manufacturing industry sectors to the TRI program. These industry sectors will be required to report to TRI for the 1997 calendar year. These reports will be due to EPA on July 1, 1998. Among the proposed industry sectors included in the expansion are: metal mining, coal mining, electrical utilities, RCRA SubtitleC hazardous waste treatment and disposal facilities; chemical and allied product wholesale distributors; petroleum bulk stations and terminals; and solvent recovery services.

Phase 3: Chemical Use Reporting

EPA is actively exploring the nature, scope, and issues involved in requiring the collection of chemical use information. On October 1, 1996, EPA issued an Advance Notice of Proposed Rulemaking announcing the Agency's intent to move forward on this issue.

Future TRI Modifications

Pollution Prevention Act Reporting : EPA is currently developing a supplemental notice of proposed rulemaking to clarify how facilities collect and report information on source reduction and recycling activities. EPA plans to finalize this rule before 1997 reporting.

Form R Redesign : For reporting year 1996, EPA has redesigned the Form R and will issue a new five-page form.

Persistent Bioaccumulators : EPA is evaluating options for better addressing the need to collect information on chemicals that are identified as toxic persistent bioaccumulators. These are chemicals that build up in organisms, such as fish and plants, and can have adverse effects on human health and the environment. Options include adding new toxic bioaccumulators to the TRI list and lowering the reporting threshold for these chemicals.

Hazard Assessments : EPA is conducting a detailed hazard assessment of the original TRI chemicals to determine whether these chemicals meet the toxicity criteria for listing.

33/50 Program

EPA established the 33/50 Program in 1991. This program was EPA's first voluntary initiative aimed at reducing the releases and transfers of toxic chemicals. From the list of TRI chemicals, EPA selected 17 chemicals for the program. The name is derived from the program's two goals: a 33% reduction by 1992 and a 50% reduction by 1995. The baseline year was 1988. The success of the program has shown how EPA and industry can work positively in a cooperative fashion. EPA is now evaluating the results and lessons learned and discussions are now underway to determine the benefits of additional voluntary programs.

International Aspects of TRI

Toxic chemical releases know no boundaries. While TRI data provides a wealth of information about releases and transfers of toxic chemicals within the United States, information on releases and transfers coming from other countries is limited. This situation, however, is changing. There are an increasing number of countries developing TRI-like systems. The international term for these systems is Pollutant Release and Transfer Registers (PRTRs).

There presently are six nations with PRTR systems (Canada, France, Netherlands, Norway, United Kingdom, United States). Many more nations are in various stages of establishing a system (Australia, Czech Republic, Denmark, European Union, Finland, Japan, Mexico, Sweden, Switzerland). With the Earth Summit, the Organization for Economic Co-operation and Development and other international organizations stressing the importance and value of PRTR systems, still more nations are considering taking similar steps.

CHAPTER 4: 1995 TOXICS RELEASE INVENTORY

For reporting year 1995, 21,951 facilities filed 73,311 TRI reporting forms. Also for the 1995 reporting year, the number of chemicals on the TRI list almost doubled. A total of 4,410 out of the 73,311 forms for 1995 are for the newly added chemicals.

As decribed earlier in this overview, TRI data alone cannot indicate the risk that chemical releases pose to human health and the environment. Though TRI data are useful as a starting point in identifying potential risks, other information is requirement to evaluate risk in a particular area.

Beginning in 1995, facilities that meet reporting requirements, but whose &quottotal annual reportable amount&quot for a TRI chemical does not exceed 500 pounds, may submit a &quotcertification&quot form, or Form A. Unlike the TRI Form Rs, Form As do not include amounts of the chemical released to the environment or transferred to other locations. Facilities submitted 6,437 Form As in 1995.

On-Site Releases

In 1995, facilities reported releasing 2.2 billion pounds of listed toxic chemicals into the nation's environment. Table 2 shows the quantity of listed chemicals released to air, water, and land and injected underground.

Table 2. 1995 TRI Releases

	Pounds
Total Releases	2,208,749,411
Fugitive Air	85,094,609
Point Source Air	1,177,227,504
Surface Water	136,315,624
Underground Injection	234,979,709
On-site Land Releases	275,131,965

Figure 1 shows the distribution of toxic chemical releases by type of release. Air emissions constituted approximately 71% of all toxic chemical releases in 1995. Surface water discharges, which include releases to rivers, lakes, oceans, and other bodies of water, accounted for 6% of all releases. Underground injection accounted for almost 11% of total releases, while on-site releases to land, which include landfills, surface impoundments, and other types of land disposal, accounted for nearly 13%. (Box 4-1 in Chapter 4 provides an explanation of these release types.)

Off-Site Transfers

In 1995, facilities reported transfers of 3.5 billion pounds of toxic chemicals in waste to off-site locations for recycling, energy recovery, treatment, and disposal.

Table 3 shows the quantity of toxic chemicals transferred to off-site locations for each type of waste management activity, and Figure 2 shows their distribution by waste management activity. Transfers to off-site locations for recycling accounted for about 63% of all transfers. Nearly 15% of transfers were for energy recovery. Transfers to treatment and disposal, including those sent to publicly owned treatment works (POTWs), accounted for nearly 23%. (Box 4-2 in Chapter 4 explains the transfer types. Except for transfers for disposal, transfers do not necessarily represent entry of the chemical into the environment.)

Table 3. 1995 TRI Transfers

	Pounds
Total Transfers	3,534,827,951
Transfers to Recycling	2,213,731,389
Transfers to Energy Recovery	512,029,726
Transfers to Treatment	287,576,863
Transfers to POTWs	239,836,516
Transfers to Disposal	279,222,397
Other Off-site Transfers*	2,431,060

* Does not include "other" off-site transfers, i.e., those reported without valid waste management codes.

Releases and Transfers of Newly Added Chemicals, 1995

Beginning with the 1995 reporting year, EPA added 286 chemicals* to the TRI list, nearly doubling its previous chemical coverage. Among the additions are chemicals specifically affecting children's health, carcinogens, chemicals used as pesticides, and some that are released in great quantities to the air, potentially affecting air quality and respiratory health.

Releases of the newly added chemicals totaled 238 million pounds, which represents approximately one tenth (11%) of releases reported for all TRI chemicals in 1995, as shown on Table 4. Off-site transfers totaled 155 million pounds, a much smaller portion (4%) of transfers reported for all TRI chemicals, as shown on Table 5.

* Of the 286 chemicals, 20 were diisocyanates and 19 were polyaromatic compounds. These are reported not as individual chemicals, but as 2 chemical compounds. Furthermore, 3 other

chemicals have been remanded, and one chemical was not reportable for 1995 because of an administrative stay. Therefore, the number of reportable chemicals added to the TRI in 1995 was 245.

Table 4. 1995 TRI Releases of Newly Added Chemicals

	Pounds	Percent of All TRI Chemicals
Total Releases	237,722,570	10.76
Fugitive Air	26,370,105	6.85
Point Source Air	63,104,521	5.36
Surface Water	90,243,306	66.20
Underground Injection	54,116,863	23.03
On-site Land Releases	3,887,775	1.41

Table 5. 1995 TRI Transfers of Newly Added Chemicals

	Pounds	Percent of All TRI Chemicals
Total Transfers	155,088,391	4.39
Transfers to Recycling	29,473,788	1.33
Transfers to Energy Recovery	24,832,143	4.85
Transfers to Treatment	31,029,283	10.79
Transfers to POTWs	59,387,743	24.76
Transfers to Disposal	10,357,700	3.71
Other Off-site Transfers*	7,734	0.32

* Does not include "other" off-site transfers, i.e., those reported without valid waste management codes.

Facilities reported large amounts of releases of some of the newly reportable chemicals. More nitrate compounds, for example, were reported as discharges to water in 1995 than any other chemical on the TRI list (more than 88 million pounds). Nitrate compounds were also the chemical most reported, among all TRI chemicals, as injected to underground wells (46

million pounds). This reporting of nitrate compounds has influenced the distribution of reported releases by type of release: Surface water discharges account for 38% of releases for the new chemicals, but only 2% of releases reported for all other TRI chemicals.

N-Hexane is the chemical with the second largest releases among the newly added chemicals. Almost all releases of n-hexane are reported as air emissions (77 million pounds), and they represent 86% of the total air emissions of the newly added TRI chemicals and 3% of the total air emissions of all TRI chemicals.

Chapter 4 provides additional information on nitrates, n-hexane, and other chemicals of particular interest from the expanded TRI list.

Releases and Transfers by State, 1995

The top states for total releases for 1995 reporting were Texas with 284 million pounds, Louisiana with 172 million pounds, and Ohio with 122 million pounds. As shown in Chapter 4, third-ranked Ohio had the largest number of reporting facilities (1,623) and Form As (485) in 1995, but Texas had a greater number of total forms (5,705).

The total quantity of releases reported by these states does not necessarily indicate that risks from toxic chemicals are highest in these states. Release totals do not take into account the geographic size of the state or the size of its population. As discussed above, the risk from releases of toxic chemicals depends on a variety of factors, including the type of release, the toxicity of the chemical, and the proximity of populations to the releases.

As with releases, Texas reported more total off-site transfers than any other state, 343 million pounds in 1995, followed by Ohio (319 million pounds), and Indiana (261 million pounds).

Releases and Transfers by Industry, 1995

In the private sector, only manufacturing facilities in SIC codes 20 through 39 were required to report to TRI for 1995. Box 3 lists the industry groups currently subject to TRI, along with their corresponding SIC codes. Facilities owned and operated by the federal government were required to report for the first time in 1994. Other industry groups are currently under consideration for addition to the reporting requirements (as discussed in Chapter 3).

Box 3. Standard Industrial Classification (SIC) Codes

20 Food and kindred products
21 Tobacco products
22 Textile mill products
23 Apparel and other finished products made from fabrics and similar materials
24 Lumber and wood products, except furniture

25 Furniture and fixtures
26 Paper and allied products
27 Printing, publishing, and allied industries
28 Chemicals and allied products
29 Petroleum refining and related industries
30 Rubber and miscellaneous plastics products
31 Leather and leather products
32 Stone, clay, glass, and concrete products
33 Primary metal industries
34 Fabricated metal products, except machinery and transportation equipment
35 Industrial and commercial machinery and computer equipment
36 Electronic and other electrical equipment and components, except computer equipment
37 Transportation equipment
38 Measuring, analyzing, and controlling instruments; photographic, medical and optical goods; watches and clocks
39 Miscellaneous manufacturing industries

TRI reporting forms allow facilities to report more than one SIC code to fully characterize their operations. Facilities that reported two or more two-digit SIC codes (major groups) within the manufacturing range of 20-39 [for example, petroleum (29) and chemicals (28)] are assigned to a &quotmultiple codes&quot category.

The industries with the largest quantities of reported toxic chemical releases in 1995 were chemicals (788 million pounds), primary metals (331 million pounds), and paper (233 million pounds). The industries with the largest total transfers to off-site locations were the primary metals industry (987 million pounds), chemicals (952 million pounds), and electrical equipment (416 million pounds). Facilities reporting more than one SIC code rank among the top five in both categories.

Releases and Transfers by Federal Facilities, 1995

In 1995, 144 federal facilities reported to TRI. They reported total releases of 7.9 million pounds and total transfers of 6.5 million pounds. Department of Defense facilities accounted for 71% of releases reported by federal facilities and 88% of transfers. As shown in Chapter 4, air emissions dominate federal facilities' reporting of releases, as they do for all TRI facilities.

Federal facilities reported off-site transfers 1.4 million pounds less than on-site releases in 1995-that is, the amount of transfers was a little more than three quarters of the amount of releases. In contrast, off-site transfers from all TRI facilities were one and a half times greater than on-site releases.

Chemical-Specific Release Data, 1995

Table 6 shows the 10 TRI chemicals released in the greatest quantity in 1995. Facilities reported releasing more than 100 million pounds each of four chemicals: methanol, 245 million pounds; ammonia, 195 million pounds; toluene, 146 million pounds, and nitrate compounds, 138 million pounds. For the first three of these chemicals, the primary release medium is air. More nitrate compounds are discharged to water than any other chemical, and more zinc compounds to land. Nitrate compounds are also the chemical most reported as injected to underground wells.

Both nitrate compounds and n-hexane (ranked ninth) are among chemicals added to the TRI list in 1995.

Table 6. Top 10 Chemicals for Total Releases, 1995

Chemical	Total Releases Pounds
Methanol	245,012,356
Ammonia	195,096,446
Toluene	145,887,469
Nitrate compounds	137,743,102
Xylene (mixed isomers)	95,739,943
Zinc compounds	87,648,691
Hydrochloric acid	85,330,532
Carbon disulfide	84,169,763
n-Hexane	77,396,162
Methyl ethyl ketone	70,054,939
Subtotal	1,224,079,403
Total for All TRI Chemicals	2,208,749,411

OSHA Carcinogen Releases, 1995

For reporting purposes, TRI designates 164 chemicals as carcinogens based on criteria set forth in the Occupational Safety and Health Administration's Hazard Communication Standards. Some of these chemicals, such as benzene or asbestos, are known to cause cancer in humans. Others are suspected to cause cancer in humans because they have been shown to cause cancer in laboratory animals.

More than 230 million pounds of TRI-listed carcinogens were released to the air, water, and land and injected underground in 1995. Table 7 shows the 10 OSHA carcinogens on the TRI list with the largest quantities of total releases in 1995.

Table 7. Top 10 OSHA Carcinogens for Total Releases, 1995

Chemical	Total Releases Pounds
Dichloromethane	57,289,960
Styrene	41,873,608
Trichloroethylene	25,489,839
Formaldehyde	19,426,396
Acetaldehyde	14,410,140
Chloroform	10,600,257
Benzene	9,592,003
Tetrachloroethylene	9,400,811
Acrylonitrile	6,471,484
Acrylamide	6,141,395
Subtotal	200,695,893
Total for All OSHA Carcinogens	230,134,414

Prevention and Management of TRI Chemicals in Waste

The Pollution Prevention Act of 1990 (PPA) expanded TRI to require reporting about quantities of TRI chemicals in waste and about source reduction activities undertaken to eliminate or reduce those quantities. Under the PPA, source reduction is considered the preferred approach to reducing toxic chemicals in waste. Figure 3 illustrates a hierarchy for waste management decision-making, with disposal of waste the last resort.
Figure 4 illustrates the quantities of TRI chemicals in waste undergoing each on-site and off-site waste management activity (recycling, energy recovery, treatment, and release/disposal). Facilities reported more than 35.0 billion pounds of TRI chemicals in waste in 1995. The amount of TRI chemicals in waste reported includes both waste generated by the facility and waste received by the facility for the purpose of waste management.

In 1995, facilities in Texas reported the largest quantity of TRI chemicals in waste, with 3.7 billion pounds. Iowa, Georgia, and North Carolina ranked high in production-related waste because a few facilities in those states reported recycling of more than 100 million pounds each of n-hexane, a chemical newly reportable in 1995.

The top industries for total production-related waste in 1995 were the chemicals, food, and

primary metals industries. Again, a few facilities' reports for n-hexane account for the food products industry's high ranking.

Table 8 shows the 10 chemicals for greatest total production-related waste reported in 1995. Nearly all of the production-related waste reported for n-hexane, first on this list, was recycling (10.6 billion pounds).

Table 8. Top 10 Chemicals for Total Production-related Waste, 1995

Chemical	Total Production-related Waste Pounds
n-Hexane	10,782,506,710
Methanol	2,299,493,988
Toluene	1,700,597,773
Hydrochloric acid	1,404,505,346
Sulfuric acid	1,384,257,511
Ethylene	1,275,337,177
Copper	1,183,291,734
Lead compounds	860,731,139
Ammonia	846,158,726
Propylene	770,833,803
Subtotal	22,507,713,907
Total for All TRI Chemicals	35,027,058,218

Table 9 shows the quantities reported for 1995 and projected for 1997 for each waste management activity along with the percent change that the projections represent.

Table 9. Quantities of TRI Chemicals in Waste, 1995 (Actual) - 1997 (Projected)

Management Activity	Actual 1995 Millions of Pounds	Projected 1997 Millions of Pounds	Change 1995-97 Percent
Recycled On-site	19,049	18,892	-0.8
Recycled Off-site	2,284	2,323	1.7
Energy Recovery On-site	2,903	2,904	0.0
Energy Recovery Off-site	501	481	-4.0

Treated On-site	7,290	7,320		0.4
Treated Off-site	557	511	-8.2	
Quantity Released/Disposed of	2,443	2,334		-4.5
Total Production-related Waste	35,027	34,764		-0.8

Facilities' projections for 1996 and 1997 show that they expect very little change in how they handle their waste in the next two years. As shown in Chapter 4, projections of 61.0% recycling of TRI chemicals in waste, 9.7% for energy recovery, 22.5% to treatment and 6.7% released or disposed of in 1997 are nearly identical to reported management of waste for 1995 (see Figure 4). The data indicate that, overall, facilities do not anticipate discernible progress in moving up the waste management hierarchy in the next two years.

Source Reduction Activities, 1995

Facilities also must provide information about source reduction activities they implemented during the reporting year. Source reduction activities reduce the amount of a toxic chemical entering a waste stream and therefore prevent pollution before it is generated. Waste management activities such as recycling are not considered source reduction because they manage toxic chemicals after they enter waste streams. Nearly 29% of all TRI facilities reported at least one source reduction activity in 1995. Table 10 lists the categories of source reduction activities and their reporting frequency.

Table 10. Source Reduction Activity, 1995

Category of Activity	Number of TRI Forms Reporting
Good Operating Practices	6,662
Inventory Control	1,599
Spill and Leak Prevention	3,441
Raw Material Modifications	2,667
Process Modifications	4,869
Cleaning and Degreasing	1,236
Surface Preparation/Finishing	1,579
Product Modification	1,265

CHAPTER 5: YEAR-TO-YEAR COMPARISONS

Chapter 5 compares TRI data for sets of &quotcore chemicals&quot - that is, chemicals that were reportable in all years of the comparison being made. (Newly added chemicals are therefore not included.)

Reported toxic chemical releases decreased by 5% between 1994 and 1995. The greatest reduction occurred in air emissions (nearly 89 million pounds). At the same time, underground injection increased 24 million pounds. Transfers increased by just 0.4% since 1994. Greater amounts were reported as transfers to energy recovery and to treatment in 1995, offset in part by declining transfers to recycling. Table 11 compares the 1994 and 1995 release and transfer quantities.

Table 11. Change in Releases and Transfers, 1994-1995*

	1994-1995 Change	
	Pounds	Percent
Total Releases	-85,396,733	-4.9
Air	-88,774,153	-6.8
Surface Water	-4,095,016	-10.2
Underground Injection	24,466,621	19.5
Land	-16,994,185	-6.0
Total Transfers	11,603,125	0.4
Recycling	-27,347,107	-1.3
Energy Recovery	30,239,186	6.6
Treatment	18,720,356	8.5
POTWs	-3,398,406	-2.1
Disposal	-5,412,184	-2.0
Other**	-1,198,720	-35.0

* Does not include delisted chemicals, chemicals added in 1995, and ammonia, hydrochloric acid, and sulfuric acid.

** Transfers reported with no waste management codes or invalid codes.

Since 1988, EPA's baseline year for TRI comparisons, releases have declined by nearly 46%. Figure 5 illustrates the change in each release type since 1988.

Change in Total Releases by State, 1988-1995

Louisiana and Texas led all states (first and second, respectively) in reducing releases over the seven-year period from 1988 to 1995. They ranked second and first, respectively, for total TRI releases in 1995. Louisiana's greatest reduc-tion has occurred in surface water discharges (106 million pounds). In Texas, the greatest decrease has been in air emissions (84 million pounds).

Change in Total Releases by Industry, 1988-1995

The chemical industry reported the largest decrease in total releases from 1988 to 1995, with a decrease of 488 million pounds. The primary metals industry had the second largest decrease, 180 million pounds. Several industries, however, have reported larger percentage decreases than these industries. The electrical equipment industry and the leather industry have both reported decreases greater than 75% from 1988 to 1995.

Change in Total Releases by Federal Facilities, 1994-1995

Federal facilities began required TRI reporting in 1994, as directed by Presidential Executive Order 12856. In their second year, 1995, federal facilities reported total TRI releases 24% below their level in the previous year, a 2 million-pound reduction. As indicated above, Department of Defense facilities account for the majority of federal releases. They also account for the greatest reductions in reported releases.

Change in Total Releases by Chemical, 1988-1995

Table 12 lists the 10 chemicals with the largest decrease in total releases from 1988 to 1995. Releases of 1,1,1-trichloroethane (TCA) declined by nearly 159 million pounds, or 88%. TCA is an ozone-depleting chemical, whose production was banned as of January 1, 1996. Table 13 lists the 10 chemicals with the largest increases in total releases from 1988 to 1995.

Table 12. Top 10 Chemicals for Decreases in Total Releases, 1988-1995*

Chemical	1988-1995 Change	
	Pounds	Percent
1,1,1-Trichloroethane	-158,466,258	-87.5
Toluene	-155,650,140	-51.6
Phosphoric acid	-119,722,557	-67.5
Chlorine	-73,991,363	-52.8
Dichloromethane	-73,807,518	-56.3
Methyl ethyl ketone	-71,515,727	-50.5
Methanol	-68,047,817	-21.7
Freon 113	-67,878,855	-96.3

Xylene (mixed isomers)	-63,885,306	-40.0
Manganese compounds	-48,545,043	-51.9
Total for Top 10 Chemicals	-901,510,584	-52.7

* Calculation of top chemicals does not include delisted chemicals, chemicals added in 1990, 1991, 1994, and 1995, and aluminum oxide, ammonia, hydrochloric acid, and sulfuric acid.

Table 13. Top 10 Chemicals for Increases in Total Releases, 1988-1995*

Chemical	1988-1995 Change	
	Pounds	Percent
Copper compounds	10,437,157	31.4
Acetonitrile	9,888,787	52.1
Styrene	7,510,509	21.9
Acetaldehyde	4,948,592	52.3
Acrylamide	3,913,496	175.7
1,2,4-Trimethylbenzene	3,087,977	69.6
Ethylbenzene	2,651,815	33.1
Acetamide	920,008	-
Methyl tert-butyl ether	858,419	32.7
m-Cresol	710,505	3,706.3
Total for Top 10 Chemicals	44,927,265	39.7

* Calculation of top chemicals does not include delisted chemicals, chemicals added in 1990, 1991, 1994, and 1995, and aluminum oxide, ammonia, hydrochloric acid, and sulfuric acid.

33/50 Program Chemicals

In 1991, EPA invited industry to participate in a program of voluntary reductions in releases and transfers of 17 targeted chemicals (listed in Box 4). The 33/50 Program took its name from its goals: 33% reduction in releases and transfers by 1992 and 50% reduction by 1995, using 1988 as a baseline. With the 1994 reporting year-one year early-the program met its 50% reduction goal.

In 1995, releases and transfers for the 17 targeted chemicals continued to decline; they totaled 664 million pounds, a 55.6% reduction from the program's 1988 baseline (see Table 14).

Box 4. 17 Priority Chemicals Targeted by the 33/50 Program

Benzene	Methyl ethyl ketone
Cadmium and compounds	Methyl isobutyl ketone
Carbon tetrachloride	Nickel and compounds
Chloroform	Tetrachloroethylene
Chromium and compounds	Toluene
Cyanide compounds	1,1,1-Trichloroethane
Dichloromethane	Trichloroethylene
Lead and compounds	Xylenes
Mercury and compounds	

Table 14. 33/50 Program Chemicals: Releases and Transfers, 1988, 1990, 1994, 1995

	Pounds
1988	1,495,489,355
1990	1,263,959,610
1994	744,431,916
1995	664,429,866

	Percent Change
1988-1990	-15.5%
1990-1995	-47.4%
1994-1995	-10.8%
1988-1995	-55.6%

* Does not include amount for recycling and energy recovery reported for 1991-1995. Also excludes delisted chemicals, chemicals added in 1990, 1991, 1994 and 1995, and aluminum oxide, ammonia, hydrochloric acid, and sulfuric acid.

Figure 6 shows the difference between the years prior to the 33/50 Program and the years after. For the two years before initiation of the program (1988 to 1990 reporting years), releases and transfers of 33/50 chemicals decreased comparably to those for all TRI chemicals. In the years since EPA's invitation to companies to participate in this program (1990 to 1995), releases and transfers of 33/50 chemicals declined 47%, compared to 26% for TRI chemicals as a whole.

TRI Chemicals in Waste, 1991-1997

From 1991, the first year of Pollution Prevention Act reporting, to 1992, the total quantity of TRI chemicals reported in production-related waste decreased 2.5%. Since then, however, total production-related waste has risen annually, for a net increase from 1991 to 1995 of nearly 7%. This increase has been in recycling, on-site treatment, and off-site energy recovery. The quantity released/disposed of has shown a 25% decrease since 1991.

Table 15 shows the change in pounds and percentage for each waste management activity from 1991 to 1995.

Table 15. Quantities of TRI Chemicals in Waste, 1991-1995

	1991-1995 Change	
Management Activity	Pounds	Percent
Recycled On-site	959,042,320	15.4
Recycled Off-site	462,118,301	26.4
Energy Recovery On-site	-190,285,784	-6.4
Energy Recovery Off-site	34,001,986	7.7
Treated On-site	653,729,220	15.0
Treated Off-site	-35,529,197	-8.2
Quantity Released/ Disposed of	-625,187,398	-25.4
Total Production-related Waste	1,257,889,448	6.8

* Data from Form R of year indicated. Does not include delisted chemicals, chemicals added in 1994 and 1995, and ammonia, hydrochloric acid, and sulfuric acid.

FURTHER INFORMATION

Regional EPA contacts and state contacts for TRI and related information appear in Appendix A of the published report. Appendix B offers information on access to TRI data and on its uses. TRI Form R appears in Appendix C.